CLAIMS

What is claimed is:

1. A system comprising:

an integrated circuit on a VLSI die; and

an embedded micro-controller constructed on the VLSI die, the micro-controller adapted to monitor and control the VLSI environment to optimize the integrated circuit operation.

2. The system of claim 1 wherein the embedded micro-controller monitors one or more of the parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the power supplied to the integrated circuit;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

3. The system of claim 1 wherein the embedded micro-controller controls at least one of the following parameters:

temperatures at one or more locations on the integrated circuit;

the integrated circuit power supply;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

4. The system of claim 1 wherein the integrated circuit comprises two or more processor cores, each core having a integer unit and a floating point unit, the micro-controller further comprising:

temperature sensors at each of the integer units and floating point units on each of the cores.

5. The system of claim 1 further comprising:

embedded ammeters constructed on the VLSI integrated circuit die, the ammeters comprising voltage controlled oscillators.

6. The system of claim 1 further comprising:

fuses that provide hardware selection of VLSI integrated circuit environment parameters that are monitored by the embedded micro-controller.

7. The system of claim 1 further comprising:

firmware for controlling operations of the embedded micro-controller.

8. A method for monitoring and controlling an integrated circuit comprising:

providing an embedded micro-controller on a same VLSI die as the integrated circuit; and

monitoring and controlling a VLSI environment of the integrated circuit with the embedded micro-controller.

9. The method of claim 8 further comprising:

monitoring, by the embedded micro-controller, one or more integrated circuit parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the power supplied to the integrated circuit;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

10. The method of claim 8 further comprising:

controlling, by the embedded micro-controller, one or more processor parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the integrated circuit power supply;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

11. The method of claim 8 further comprising:

controlling, using the embedded micro-controller, the VLSI environment to optimize an integrated circuit operating power level to approach a design limit.

12. The method of claim 8 further comprising:

monitoring, using the embedded micro-controller, a temperature in a location of the integrated circuit; and

reducing, using the embedded micro-controller, a power supply voltage in response to an over-temperature condition in the location.

13. The method of claim 8 further comprising:

monitoring, using the embedded micro-controller, a temperature in a location of the integrated circuit; and

reducing, using the embedded micro-controller, a processor operating clock frequency in response to an over-temperature condition in the integrated circuit.

14. The method of claim 8 wherein the integrated circuit is a processor, the method further comprising:

monitoring, using the embedded micro-controller, a temperature in a first core of the processor; and

transferring, using the embedded micro-controller, a processing workload from the first core to a second core of the processor.

15. The method of claim 8 further comprising:

monitoring, using the embedded micro-controller, current levels in the integrated circuit using ammeters comprising one or more voltage controlled oscillators.

16. A computer program product comprising a computer usable medium having computer readable program code embedded therein, the computer readable program code comprising:

code for controlling an embedded micro-controller constructed on a VLSI integrated circuit die with a processor, wherein the micro-controller monitors and controls a VLSI environment of the processor.

17. The computer program product of claim 16 further comprising:

code for monitoring, by the embedded micro-controller, one or more integrated circuit parameters selected from the group consisting of:

temperatures at one or more location on the integrated circuit;

the power supplied to the integrated circuit;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

18. The computer program product of claim 16 further comprising:

code for controlling, by the embedded micro-controller, one or more integrated circuit parameters selected from the group consisting of:

temperatures at one or more locations on the integrated circuit;

the integrated circuit power supply;

the operating clock frequency of the integrated circuit;

the power supply voltage; and

the power supply current supplied to the integrated circuit.

19. The computer program product of claim 16 further comprising:

code for controlling the VLSI environment to optimize an integrated circuit operating power level to approach a design limit.

20. The computer program product of claim 16 further comprising:

code for monitoring a temperature in a core of the processor; and

code for reducing a power supply voltage in response to an over-temperature condition in the core.

21. The computer program product of claim 16 further comprising:

code for monitoring a temperature in a core of the processor; and

code for reducing a processor operating frequency in response to an over-temperature condition in the core.

22. The computer program product of claim 16 further comprising:

code for monitoring a temperature in a first core of the processor; and

code for transferring a processing workload from the first core to a second core of the processor.

23. The computer program product of claim 16 further comprising:

code for monitoring current levels in the integrated circuits using ammeters comprising one or more voltage controlled oscillators.

24. A system for monitoring and controlling an integrated circuit comprising:

means for providing an embedded micro-controller on a same VLSI die as the integrated circuit; and

means for monitoring and controlling a VLSI environment of the integrated circuit with the embedded micro-controller.

25. The system of claim 24 further comprising:

means for controlling, using the embedded micro-controller, the VLSI environment to optimize an integrated circuit operating power level to approach a design limit.

26. The system of claim 24 further comprising:

means for monitoring, using the embedded micro-controller, a temperature in a location of the integrated circuit; and

means for reducing, using the embedded micro-controller, a power supply voltage in response to an over-temperature condition in the location.

27. The system of claim 24 further comprising:

means for monitoring, using the embedded micro-controller, a temperature in a location of the integrated circuit; and

means for reducing, using the embedded micro-controller, a processor operating clock frequency in response to an over-temperature condition in the integrated circuit.

28. The system of claim 24 wherein the integrated circuit is a processor, the method further comprising:

means for monitoring, using the embedded micro-controller, a temperature in a first core of the processor; and

means for transferring, using the embedded micro-controller, a processing workload from the first core to a second core of the processor.